STANDARD BAR BENDS

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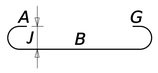

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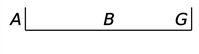

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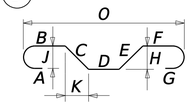

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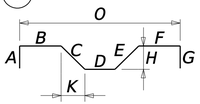

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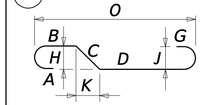

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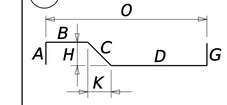

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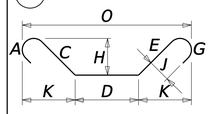

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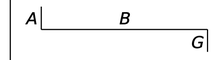

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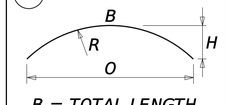

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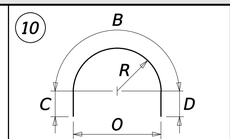

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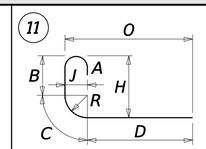

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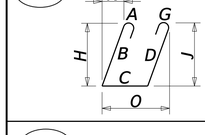

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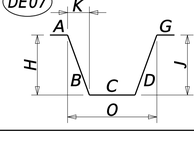

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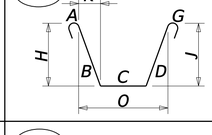

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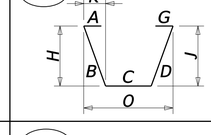

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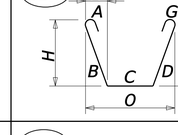

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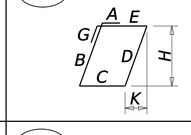

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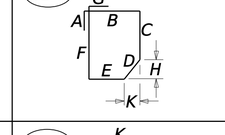

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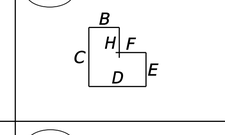

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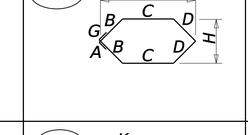

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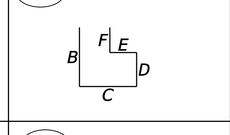

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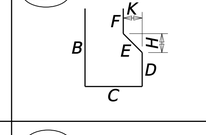

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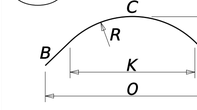

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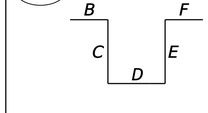

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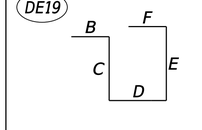

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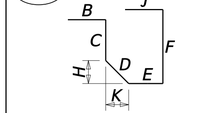

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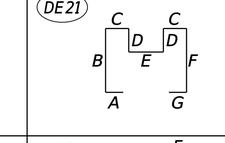

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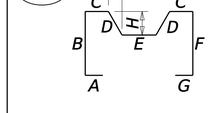

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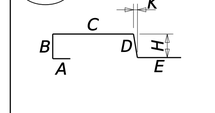

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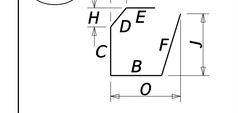

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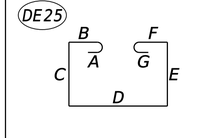

B = TOTAL LENGTH

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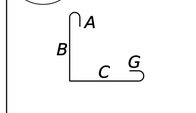

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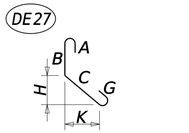

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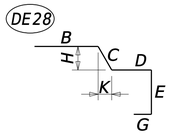

C = CIRCUM.

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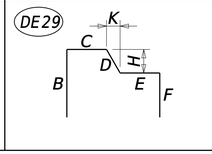

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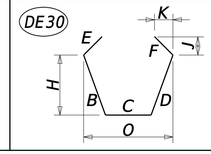

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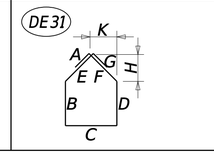

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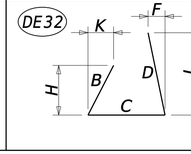

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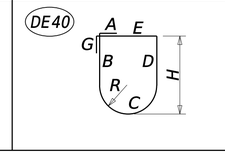

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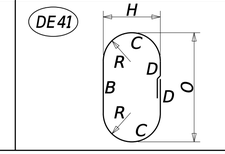

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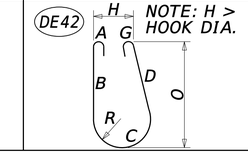
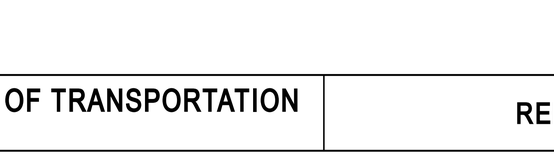


T16


X


SPIRAL NOTES:
J = TURNS AT 'F' SPACING
K = EXTRA TURNS (HALF TOP & BOTTOM)
XL PLAIN SPIRAL WITH SPACERS LOOSE
XM PLAIN SPIRAL WITH SPACERS MOUNTED

SUPPLEMENTAL BAR BENDS

15


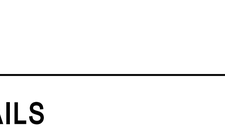
J = # OF REPEATS OF C-D-C-E SEQUENCE

25


ISOMETRIC VIEW

26


ISOMETRIC VIEW

S1


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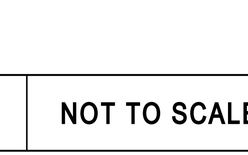

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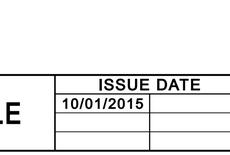

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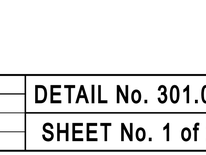

S8

S9

T4

T5

T8

T9

DE01

DE02

DE03

DE04

DE05

DE06

DE07

DE08

DE09

DE10

DE11

DE12

DE13

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DE41

DE42

NOTE: H > HOOK DIA.

DELDOT BUREAU OF BRIDGE SECTION

DELAWARE DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN MANUAL

REINFORCEMENT BAR FABRICATION DETAILS

NOT TO SCALE

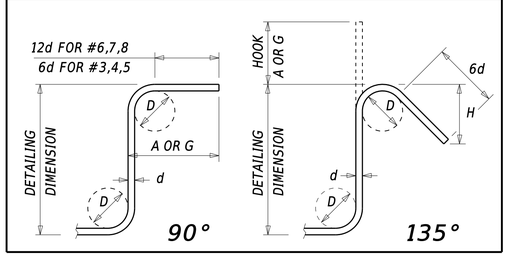
ISSUE DATE
10/01/2015

DETAIL No. 301.02

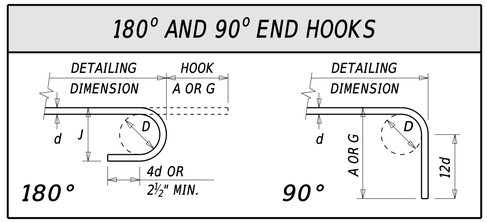
ASTM STANDARD ENGLISH REINFORCING BARS				RECOMMENDED END HOOKS, APPLICABLE TO ALL GRADES				STIRRUP AND TIE HOOKS, APPLICABLE TO ALL GRADES			
	NOMINAL DIMENSIONS				180° HOOKS		90° HOOKS		90° HOOK	135° HOOK	
BAR SIZE	DIAMETER (INCHES)	AREA (INCHES²)	WEIGHT (LBS./FT.)	D	A OR G	J	A OR G	D	A OR G	A OR G	H
3	0.375	0.110	0.376	2¼"	5"	3"	6"	1½"	4"	4"	2½"
4	0.500	0.200	0.668	3"	6"	4"	8"	2"	4½"	4½"	3"
5	0.625	0.310	1.043	3¾"	7"	5"	10"	2½"	6"	5½"	3¾"
6	0.750	0.440	1.502	4½"	8"	6"	1-0"	4½"	1-0"	8"	4½"
7	0.875	0.600	2.044	5¼"	10"	7"	1-2"	5¼"	1-2"	9"	5¼"
8	1.000	0.790	2.670	6"	11"	8"	1-4"	6"	1-4"	10½"	6"
9	1.128	1.000	3.400	9½"	1-3"	11¾"	1-7"				
10	1.270	1.270	4.303	10¾"	1-5"	1-1¼"	1-10"				
11	1.410	1.560	5.313	1-0"	1-7"	1-2¾"	2-0"				
14	1.693	2.250	7.650	1-6¼"	2-3"	1-9¾"	2-7"				
18	2.257	4.000	13.600	2-0"	3-0"	2-4½"	3-5"				

COMMON STOCK STYLES OF WELDED WIRE FABRIC			
STYLE DESIGNATION	STEEL AREA (INCHES²PER FT.)		APPROX. WEIGHT (LBS. PER 100 SQ. FT.)
	LONGIT.	TRANS.	
ROLLS			
6x6-W1.4xW1.4	0.028	0.028	21
6x6-W2.0xW2.0	0.040	0.040	29
6x6-W2.9xW2.9	0.058	0.058	42
6x6-W4.0xW4.0	0.080	0.080	58
4x4-W1.4xW1.4	0.042	0.042	31
4x4-W2.0xW2.0	0.060	0.060	43
4x4-W2.9xW2.9	0.087	0.087	62
4x4-W4.0xW4.0	0.120	0.120	85
3x3-W1.4xW1.4	0.056	0.056	39
SHEETS			
6x6-W2.9xW2.9	0.058	0.058	42
6x6-W4.0xW4.0	0.080	0.080	58
6x6-W5.5xW5.5	0.110	0.110	80
4x4-W4.0xW4.0	0.120	0.120	85

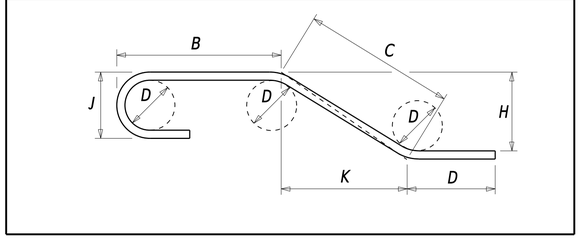
STIRRUP AND TIE HOOKS



180° AND 90° END HOOKS



ENLARGED VIEW SHOWING BAR BENDING DETAILS



TYPICAL REINFORCEMENT BAR BEND NOTES

1. DETAILS SHOWN ON SHEET 1 REPRESENT BAR BEND TYPES.
2. ALL DIMENSIONS ARE OUT-TO-OUT, EXCEPT "A" AND "G" ON STD. 180° AND 135° HOOKS.
3. "J" DIMENSIONS ON 180° HOOKS TO BE SHOWN ONLY WHERE NECESSARY TO RESTRICT HOOK SIZE, OTHERWISE STANDARD 'ACI' HOOKS ARE TO BE USED.
4. WHERE "J" IS NOT SHOWN, "J" WILL BE KEPT EQUAL TO OR LESS THAN "H" ON TYPES (3), (5) AND (22). WHERE "J" CAN EXCEED "H", IT SHALL BE SHOWN.
5. "H" DIMENSIONS OF STIRRUPS TO BE SHOWN AS NEEDED TO FIT WITHIN THE CONCRETE.
6. UNLESS OTHERWISE NOTED, DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR (EXCEPT FOR BEND TYPES (11) AND (13)).
7. WHERE SLOPE DIFFERS FROM 45° OFFSET, "H" AND "K" MUST BE SHOWN.
8. WHERE BARS ARE TO BE BENT MORE ACCURATELY THAN STANDARD BENDING TOLERANCES, BENDING DIMENSIONS REQUIRING CLOSER FABRICATION SHOULD HAVE LIMITS INDICATED.
9. FOR RECOMMENDED DIAMETER "D", OF BENDS, HOOKS, ETC., REFER TO THE TABLE ON THIS SHEET.
10. TYPES (S1) - (S6), (T1) - (T3) AND (T6) - (T9) ARE APPLICABLE TO BAR SIZES #3 THROUGH #8 ONLY.

GENERAL NOTES

1. ALL REINFORCEMENT STEEL BARS SHOWN SHALL MEET THE REQUIREMENTS OF ASTM A615, A706, A767, A775, A955, OR A1035.
2. ALL REINFORCEMENT STEEL BARS SHALL BE DEFORMED UNLESS OTHERWISE SPECIFIED ON THE PLANS.
3. ALL REINFORCEMENT STEEL BARS SHALL BE DENOTED BY ITS BAR SIZE.
4. ALL MARK 'LOCATION PREFIXES' SHALL CONSIST OF TWO LETTERS AND ARE AS FOLLOWS:
   AB = ABUTMENT, AS = APPROACH SLAB, BC = BOX CULVERT, BW = BACKWALL, CL = COLUMN, DK = DECK, DL = DOWEL, DP = DIAPHRAGM, FT = FOOTING, HW = HEADWALL, MB = MISC. BARS, MS = MOMENT SLAB, PA = PARAPET, PR = PIER, RF = RIGID FRAME, SC = SHEETPILE CAP, SS = SLEEPER SLAB, TW = TOEWALL, WL = WALL (UNIQUE LOCATION), AND WW = WINGWALL.
5. BAR MARK SUFFIXES:
   A. SUFFIX 'E' DENOTES EPOXY COATED BAR REINFORCEMENT
   B. SUFFIX 'G' DENOTES GALVANIZED BAR REINFORCEMENT
   C. SUFFIX 'S' DENOTES STAINLESS STEEL BAR REINFORCEMENT

DESIGNER NOTES

1. BAR MARKS MUST BE NAMED IN THE FOLLOWING FORMAT:
   LOCATION PREFIX --> BAR SIZE --> MARK COUNT (TWO DIGITS) --> SUFFIX 'E', 'G', 'S', OR BLANK (FOR BLACK BAR)
   FOR EXAMPLE: AB501E, BW617G, MS537, OR DK719S, ETC.

2. SPLICING & LAPPING OR REINFORCEMENT BARS:
   - ALL INFORMATION PERTAINING TO MINIMUM REQUIRED SPLICING & LAPPING LENGTHS SHOULD BE CLEARLY SHOWN ON THE PLANS.
   - MINIMUM LENGTHS MUST BE IN ACCORDANCE WITH A5.10.8 FOR REINFORCING BARS AND WELDED WIRE FABRIC.
   - INCREASE THE BAR LAPS BY 20% FOR A THREE-BAR BUNDLE. ADD 33% FOR A FOUR-BAR BUNDLE. DO NOT OVERLAP INDIVIDUAL BAR SPLICES WITHIN THE BUNDLE.

3. REFER TO THE ENGINEERING INSTRUCTIONS DOCUMENT: BR-10-001 FOR GUIDANCE ON INSTALLING AND USING THE DELDOT REBAR SHEET PROGRAM. THE DOCUMENT CAN BE FOUND IN THE FOLLOWING LINK:
   http://www.deldot.gov/information/business/drc/pd_files/plan_development/ei-br-10-001_rebar_program.pdf

4. ALL STANDARD BAR BENDS WILL BE INDICATED ON THE REBAR SCHEDULE. THE SUPPLEMENTAL BAR BENDS USED FOR THE PROJECT WILL BE SHOWN ON THE REBAR SCHEDULE.

5. ALL INFORMATION PERTAINING TO WELDED WIRE FABRIC ON THIS SHEET ARE FOR INFORMATION PURPOSES ONLY. WELDED WIRE FABRIC IS NOT INCLUDED IN THE REBAR PROGRAM AND THEREFORE WILL NOT BE SHOWN ON THE REBAR SHEET.

6. DETAILS AND NOTES AS SHOWN UNDER THIS DETAIL ARE SOLELY FOR FABRICATION OF REINFORCEMENT BAR. FOR FURTHER GUIDANCE ON DESIGN AND DETAILING OF BAR REINFORCEMENT, REFER TO SECTIONS 106, 107, 109, AND 205.

7. 'TYPICAL REINFORCEMENT BAR BEND NOTES' ARE AUTOMATICALLY GENERATED BY THE REBAR PROGRAM.